Common Experiment Workbook (Formerly *art* Workbook)

Rob Kutschke

March 3, 2013

Outline

- Introduction
- Elements of Documentation
  - Defines some language.
- Overview of the *art* Documentation
- Relationship of the *art* documentation to the per experiment documentation.
- Targets for May 1

Introduction

- The *art* workbook is part of a much broader documentation project.

- The purpose of this presentation is to sketch the broader project and show where the *art* workbook lives within that broader project.

- It was clear in our previous meeting that we need to carefully define some language.

Target Audience

- Physicists (users and developers) on current and future experiments that use SCD supported software.
  - Including new experiments evaluating *art*. (eg. Darkside50)
- Some levels within the user role:
  - Novice
    - Needs a guided tour, without too much detail.
  - Intermediate
    - Needs complete, well indexed and well cross-referenced explanations of how things work and how to use them.
  - Expert
    - Quickly find API details and a high level overview of functionality.
- A non-user role
  - Technical Developer (of art, for example).

Stakeholders

- The target audience
  - Including experiment liaisons.
- Documentation developers
  - Heavey, Kutschke
  - Consultants:
    - Kowalkowski, Paterno, Green
  - Others for UPS/UPD, Grid, build system …
  - Testers
  - Maintainers, present and future.
- SCD Management

What Software Will be Included in this Documentation Project?

- All software supported by SCD for use by the target audience.

- Including:
  - *art*
  - SAM
  - Grid software, broadly construed
  - Any in-house elements of the tool chain on which the above depends
  - …. what have I forgotten

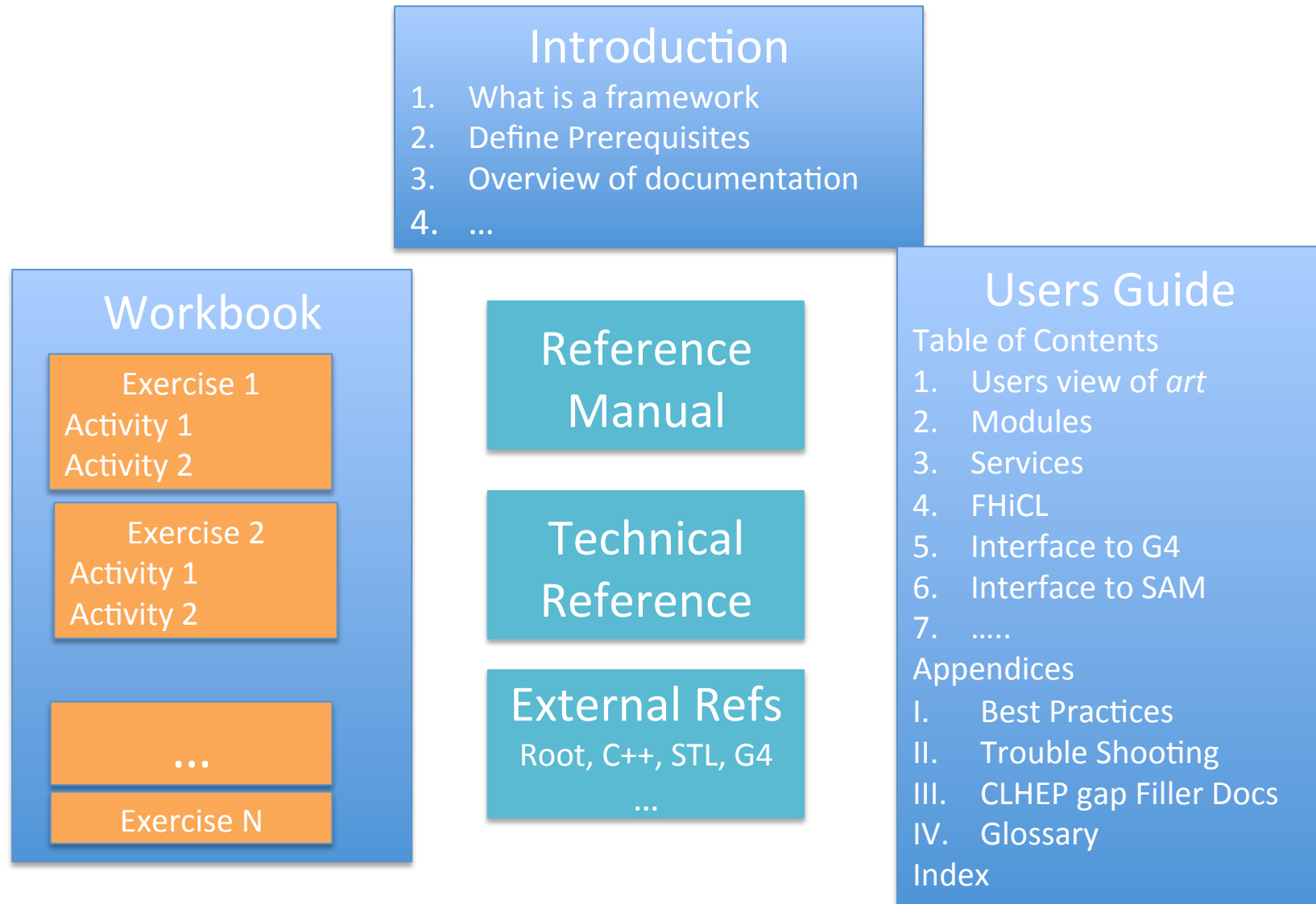- Don't rewrite existing documentation: link to it.

The Rest of this Presentation

- Sketch the elements of the complete documentation suite

- Discuss how this outline addresses the three roles described on the previous page.

- Some details on the short term deliverables
  - art Workbook
  - art Users Guide

The Big Picture

- The next slide shows a diagram of all of the pieces of the *art* documentation project.
  - The slides following that will define terms used in this picture.
  - After that we will return to the big picture slide
- Later on we will give an example of how the art documentation interacts with the experiment specific documentation.
  - See pages 25, 26, 27

The *art* Documentation Suite

Introduction
1. What is a framework
2. Define Prerequisites
3. Overview of documentation
4. ...

Workbook

Exercise 1
Activity 1
Activity 2

Exercise 2
Activity 1
Activity 2

...

Exercise N

Reference Manual

Technical Reference

External Refs
Root, C++, STL, G4
...

Users Guide
Table of Contents
1. Users view of *art*
2. Modules
3. Services
4. FHiCL
5. Interface to G4
6. Interface to SAM
7. .....
Appendices
I. Best Practices
II. Trouble Shooting
III. CLHEP gap Filler Docs
IV. Glossary
Index

The Two Main Pieces

- A work-at-your-own pace tour of how to get started and how things work.
  - Minimal details
  - We call this the *Workbook*
  - Targeted at novice users
- The complete details, table of contents, index, glossary ….
  - We call this the *User Guide*
  - Targeted at intermediate users

Elements of Documentation

- Prerequisites
- *Workbooks* – sets of *Exercises*
- *User Guide*
- *Reference Manual (API)*
- *Technical References*
- *External References*
- *Gap Filler Documentation*
- *Discussion forum*
- Glossaries and Indices
- Other …
- All cross-referenced
- Scope each correctly and understand interfaces

Items in blue are defined on the following pages

Definition: *Exercise*

- Introductory text.
- Some example code to build and run.
  - It must ``just work".
- Explanatory text
  - Explains major ideas introduced in the exercise.
  - Refers to detailed information in other *Exercises*, in other *Workbooks*, and in the *Users Guide*
  - There should few direct references to the *Reference Manual* and no references to the *Technical Manual (different audiences).*
- Suggested *activities*:
  - Modify code or config file, rebuild and rerun
  - Where appropriate, answers to the *activities*.

Definition: *Workbook*

- A set of *Exercises*
  - Inherently sequential: *Exercise* N assumes that the user is familiar with all material in Exercises 0 … N-1.
  - There will likely be some standalone exercises that are independent of each other and may be done in any order.

- The normal entry point for a new user.

- Gives a guided tour of the ideas, tools and documentation.

- Defines language and ideas that the user needs to understand the rest of the documentation.

Definition: *Users Guide*

- Everything that the user needs to know to make effective use of the software:
  - Few people will read this cover to cover.
  - Table of Contents, index, glosssary are all critical.
- May refer to the *Workbook*.
- Does not explain implementation details.
- Exercises will often refer into it.
- Appendices are a natural location for
  - Best practices, especially environment specific ones.
  - *Gap Filler Documentation*
  - Anything else that has no better home.

Definition: *Reference Manual*

- Documents the API

- May refer to the *Users Guide* for a users view of what the code does.

- May refer to the *Technical Manual* to explain how the internals work.

- Probably auto-generated from annotated source code; eg Doxygen.

Very Strongly Recommend

- Keep the roles of the *Users Guide* and *Reference Manual* distinct – it's very tempting, but a very bad idea, to mix them together.

Definition: *Technical Manual*

- The inner details of how it all works.

- Target audience is developers and maintainers, both current and future.

- Some motivated users will look at it but they are not the target audience.

Definition: *External References*

- Any material that is not part of this documentation project
  - ROOT, Geant4, CLHEP and boost documentation
  - C++ language reference
  - STL reference
  - C++ best practices documents
  - Existing SAM documentation
  - Existing Grid documentation
  - …

Definition: *Gap Filler Docs*

- Fill gaps in existing documentation
  - For docs that we do not own.
  - Prefer doc owners to improve their product but …
- For example:
  - For parts of CLHEP, the only docs are the header files:
    - Good enough for users with intermediate C++ skills
    - Not good enough for beginners; what is an .icc file?
    - Beginners see this very early in their learning
    - Hep3Vector, SystemOfUnits, Matrices
- Probably appendices to the Users Guide?

Definition: *Discussion Forum*

- A place for users to ask questions of each other and of the developers.

- Also a place to give feedback to the documentation team.

- Candidate: Sharepoint.

- How does this interact with the existing issue tracking system (in redmine) ?

Review: Terms Defined So Far

- *Exercise*
- *Activity*
- *Workbook*
- *Users Guide*
- *Reference Manual*
- *Technical Manual*
- *External Reference*
- *Gap Filler Documentation*
- *Discussion Forum*

Matching Elements with Level

- Novice
  - Needs a guided tour, without a lot of detail.
  - Workbook
- Intermediate
  - Needs complete, well indexed, and well cross-referenced explanations of how things work and how to use them.
  - Users' Guide
- Expert/Developer
  - Quickly find API details and a high level overview of functionality.
  - Reference Manual
- Art developer
  - Technical Reference

The *art* Documentation Suite

Introduction
1. What is a framework
2. Define Prerequisites
3. Overview of documentation
4. …

Workbook

Exercise 1
Activity 1
Activity 2

Exercise 2
Activity 1
Activity 2

…

Exercise N

Reference Manual

Technical Reference

External Refs
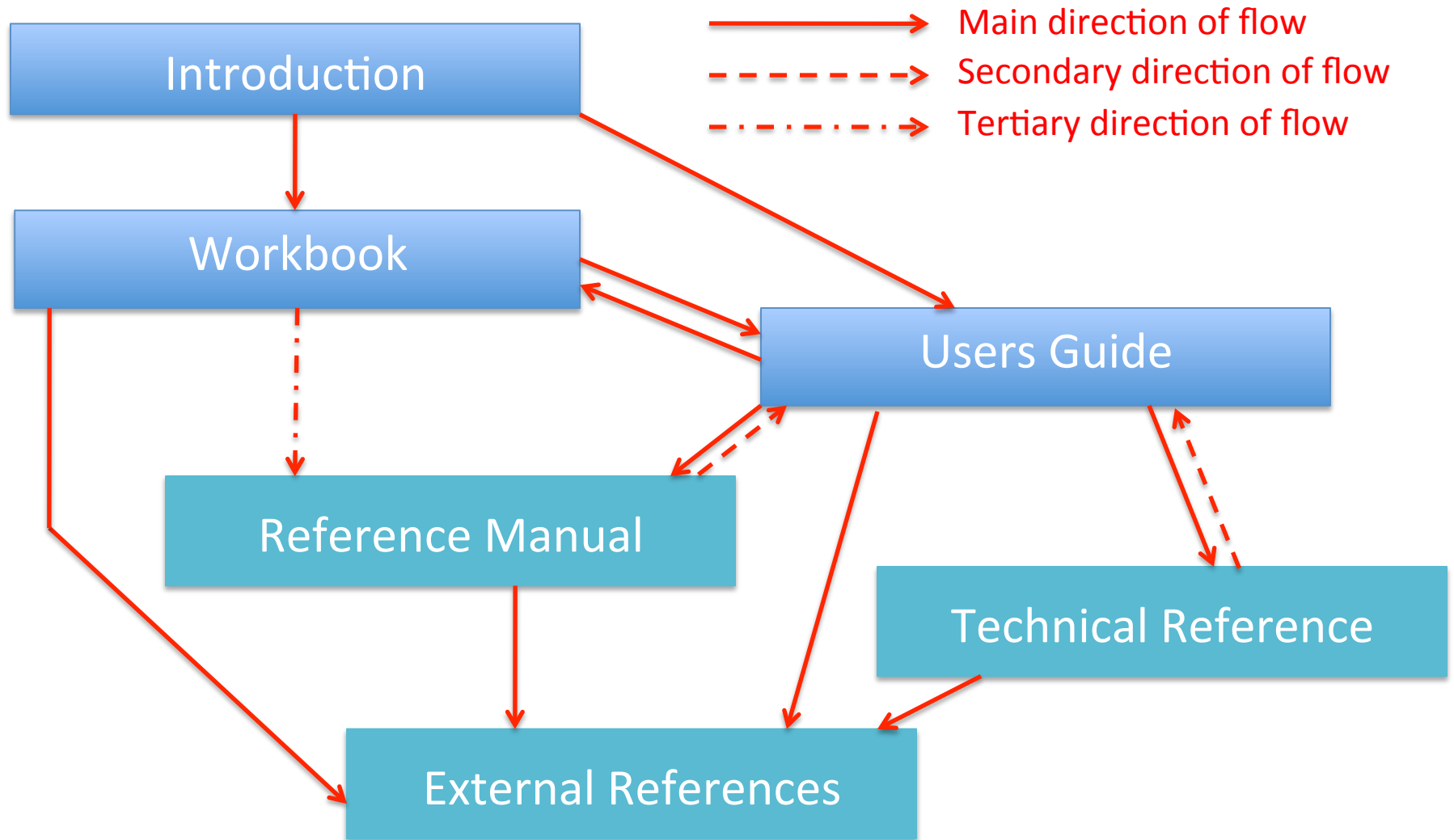Root, C++, STL, G4
…

Users Guide
Table of Contents
1. Users view of *art*
2. Modules
3. Services
4. FHiCL
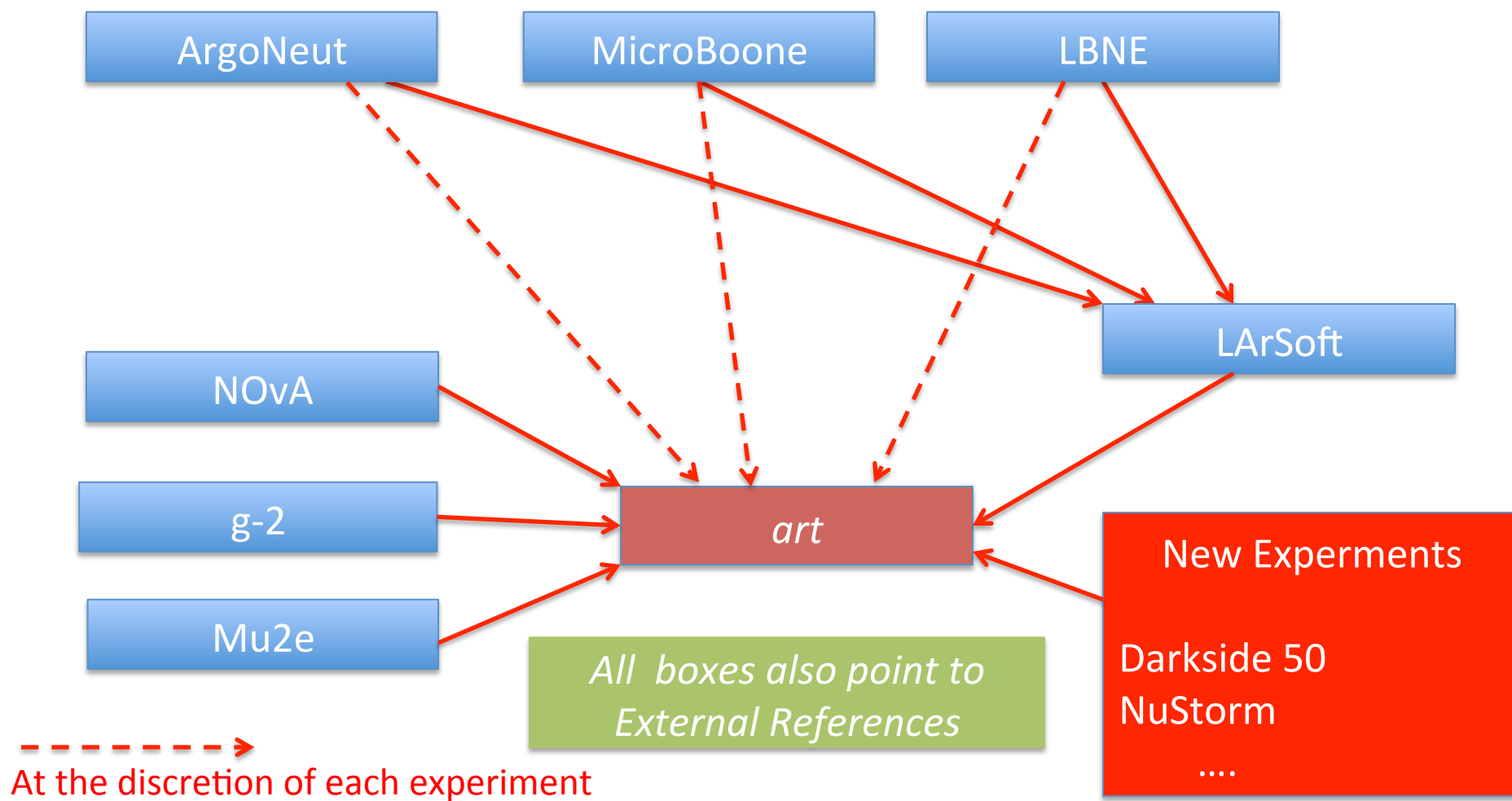5. Interface to G4
6. Interface to SAM
7. …..
Appendices
I. Best Practices
II. Trouble Shooting
III. CLHEP gap Filler Docs
IV. Glossary
Index

Hierarchy of The Elements

Kutschke/Common Workbook

Relationship of *art* Documentation to Documentation of each Experiment

ArgoNeut

MicroBoone

LBNE

NOvA

g-2

Mu2e

LArSoft

art

New Experments

Darkside 50
NuStorm
….

All boxes also point to External References

At the discretion of each experiment

Experiment Specific Documentation

- The responsibility of each experiment
- Experiment specific docs may:
  - Refer (hotlink) into the *art* documentation suite
  - Delegate to the *art* documentation suite:
    - *art* exercises 1…3 are prerequisites for Mu2e exercise 1.
- Design the art documentation to enable references and delegation.
  - Experiment agnostic – based on toy detector.

Example: Mu2e's Plan

- Envision a Mu2e *Workboo*k and a Mu2e User Guide.
  - Focused on Mu2e defined code and ideas;
    - On their interactions with each other.
    - On their interactions with art
  - Delegate generic ideas to the *art* documentation.
  - describe choices Mu2e made about how to use *art.*
- Outline of Mu2e Workbook:
  - Introduction
  - Do art Workbook examples 1…3
  - Do some Mu2e specific exercises
  - Do art Workbook exercises 4,5
  - Do some more Mu2e specific exercises
  - And so on.
- Mu2e Workbook and Users Guide will reference into art documentation.

About SAM and the Grid

- Existing SAM and grid documentation are *External References*.
- Details of the interactions among SAM, *art* and the grid workflow belongs in the *art Users Guide*
- Where do workbook exercises belong?
  - TBD
    - In the *art* workbook?
    - In the per experiment workbooks (or equivalent)?
    - The issue is what SAM data sets and VO will be used for the exercise; these are experiment specific.

About ROOT

- Don't repeat existing ROOT documentation.
- Gap Filler Documentation
  - Where to find the ROOT documentation.
    - Any tricks for using it efficiently?
  - ROOT can be used in many ways.
    - Describe some of the choices *art* made and why.
  - Recommendations for best practices of using ROOT in the *art* environment.
    - May be somewhat experiment specific?

Goals for May 1

- Introduction deployed
- Workbook and Users Guide.
  - Deployed in outline form with some content …
- Some number of Workbook exercises, plus the backing documentation in the Users Guide.
  - Tested and deployed.
  - RK: prefers fewer done well to more done less well.
- Understand what it will take to deliver the full documentation project.

Beyond May 1

- June 10
  - Be ready to participate in the FIFE workshop.

- Over the summer
  - Get feedback; monitor the discussion group.
  - Work with experiments to tie in to our docs.

- September (or earlier ?)
  - Start Phase II

Draft Outlines

- Draft outline for the *art* Workbook
  - https://cdcvs.fnal.gov/redmine/projects/art-workbook/wiki/Rob's_Outline
- Draft outline for the *art* Users Guide
  - https://cdcvs.fnal.gov/redmine/projects/art-workbook/wiki/Rob's_Reference_Manual_Outline
- Wiki for our working notes.
  - https://cdcvs.fnal.gov/redmine/projects/art-workbook

Technology Choice

- Requirements:
  - Version control
    - Support for structural revisions on the fly
      - Add new exercise/chapter
      - Split exericise/chapter into two
    - Multiple versions available at the same time.
  - Produce online-friendly and printer-friendly output.
- We are currently using:
  - LaTeX + git (source code management)
  - latex2html or equivalent

Anne's Role: Editor and Tech Writer

- … and "Project Manager Lite"
- Deploy and maintain the outline on the site.
- Integrate existing material into the outline
  - Test that exercises work
  - Turn rough material from SME into the real deal.
  - Provide consistent look and feel
- Bring CMS experience; acquire their survey results; learn about amount of ongoing effort.
- Identify and keep records of
  - Undefined terms and ideas
  - Missing link targets
  - Existing material not (yet) incorporated
- Feedback to me on what is working and what is not, from the editor's point of view.
- Work with me to keep pressure on SMEs to produce the missing content.

Status of Workbook Code

- Advanced prototype working on Feb 15.
  - In a git repository.
  - Based on a toy detector
  - Design includes feedback from Kowalkowski, Paterno, Green, Lyon, Rebel and from my experience with summer 2012 Mu2e workshop.
- Available on GPCF machines
- Planned features will be complete in a few weeks
  - A few working days of my time.
- Expect new features to be added over time

Status of LaTeX Source

- LaTex + git
  - Technology is proven
  - Gaining experience

Change Log

- Version 5
  - Update stakeholders: testers, liaisons, maintainers
  - Add slides 8,9,10 as an intro to the Definitions section.
  - Add plans for after May 1
  - Anne's role includes
    - Project manager lite
  - Homework
    - Track down any feedback CMS has.
    - Learn how much ongoing effort in CMS puts into their workbook.